

# THE ANALYST.

APRIL, 1901.

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## PROCEEDINGS OF THE SOCIETY OF PUBLIC ANALYSTS.

THE monthly meeting of the Society was held on Wednesday evening, March 6, in the Chemical Society's Rooms, Burlington House. The President (Dr. J. Augustus Voelcker, M.A., B.Sc.) occupied the chair.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT read the following reply which he had received to the address from the Council which had been transmitted to His Majesty the King on the occasion of the death of her late Majesty the Queen :

HOME OFFICE, WHITEHALL.  
*February 15, 1901.*

SIR,

I am commanded by the King to convey to you hereby His Majesty's thanks for the loyal and dutiful address of the President and Council of the Society of Public Analysts, expressing their sympathy with His Majesty and the Royal Family on the occasion of the lamented death of her late Majesty Queen Victoria.

I am, Sir,

Your obedient servant,

(Signed) CHARLES T. RITCHIE.

The President of the Society of Public Analysts,  
Burlington House, W.

The nomination of Dr. T. E. Thorpe, C.B., F.R.S., for election as an Honorary Member of the Society was read for the second time.

Certificates of proposal for election to membership in favour of Messrs. H. Wippell Gadd and A. H. Mitchell, B.Sc., were read for the second time; and a certificate in favour of Mr. John Webster, 21, Park Row, Greenwich, assistant to Mr. J. Kear Colwell, was read for the first time.

Messrs. A. L. H. Garside, R. G. Grimwood, J. C. Umney and H. Rowley were elected members of the Society.

The following papers were read: "The Determination of Dissolved Oxygen in Water in Presence of Nitrites and Organic Matter," by S. Rideal, D.Sc.; "Some Analyses of Oatmeal," by Bernard Dyer, D.Sc.; and "The Detection and Estimation of Preservatives in Milk," by M. Wynter Blyth, B.A., B.Sc.

## IS THE BRITISH PHARMACOPŒIA THE LEGAL STANDARD FOR THE PREPARATIONS DESCRIBED THEREIN?

BY ALFRED H. ALLEN.

*(Read at the Meeting, February 5, 1901.)*

PROBABLY the great majority of Public Analysts will have observed the rapidly increasing opposition which has existed of late in certain quarters to the claims made that, under the Sale of Food and Drugs Act, the British Pharmacopœia should be considered as a standard or guide for the articles therein mentioned, and the vigorous attempts made in certain quarters to degrade it from the position which it practically held till recently.

Public Analysts owe it to Dr. James Bell that the Pharmacopœia was not made formally an authority under the Sale of Food and Drugs Act. The Select Committee of the House of Commons, upon whose report the Amendment Act of 1879 was based, called two witnesses on the point. One was Mr. Thomas, of the Local Government Board, who expressed strongly the opinion that the British Pharmacopœia should be made the official standard under the Act for the drugs described therein. The second witness was Dr. James Bell, then Principal of the Somerset House Laboratory, who expressed the opinion that the Pharmacopœia was already in practice accepted as the standard for drugs, and that if it were made so more formally it might be troublesome with respect to slight accidental variations. I make this statement from memory, as I have had no recent opportunity of referring to the evidence in question. Dr. Bell having expressed himself satisfied with the then position of the British Pharmacopœia, the question remained in abeyance until a Sheffield pharmacist supplied to the written prescription of a medical man some tincture of opium, which was found on analysis by me to contain only one-third of the opium and a little more than one-half the alcohol present in the British Pharmacopœia tincture. In the face of the evidence given by Mr. G. T. W. Newsholme, at that time the President of the Sheffield Pharmaceutical Society, by Dr. Sinclair White, then Medical Officer of Health for Sheffield, and by myself, the Sheffield stipendiary magistrate decided that, seeing the preparation contained alcohol and opium, it was a tincture of opium, and that deficiency of these ingredients had nothing to do with the question. That decision was not allowed to rest, and the opinion of the High Court of Justice was taken, with the result that the stipendiary's decision was reversed, and the decision in *White v. Bywater* became one of the leading cases on record dealing with the question in point. It was heard before the High Court, Queen's Bench Division, before Chief Justice Coleridge and Mr. Justice A. L. Smith, who decided that the article known as tincture of opium was a well-understood term in the trade as regards the proportion of ingredients; and though the druggist did not profess to sell it according to the British Pharmacopœia, the sample supplied was not that which was asked for.

But this decision was of a limited character; and it has been forcibly contended that the Pharmacopœia is not, and never was, intended to apply to the articles named therein, except when used in dispensing a physician's prescription, or when the



British Pharmacopœia preparation was specifically demanded. This view has been recently endorsed by Dr. John Attfield, the editor of the British Pharmacopœia, who at the Plymouth meeting of the Pharmaceutical Conference, held in 1899, expressed himself as follows: "He hoped that it would be realized by everyone that the Pharmacopœia, notwithstanding the practice of tribunals and the principle on which barristers made speeches, was not a legal standard under the Sale of Food and Drugs Act; and if anyone had the courage to test a case in the superior courts, he was not afraid to forecast that the judges in the superior courts would agree with what he had stated."

But the decision in the case of *White v. Bywater* was largely owing to the evidence brought forward that the British Pharmacopœia tincture of opium was the only one recognised in the trade. If the defence had succeeded in showing that half a dozen qualities of tincture of opium were listed by wholesale druggists, possibly the court might have taken a different view, and held that the purchaser should demand the British Pharmacopœia quality of the tincture.

But I think the existing condition of the law leaves no loophole for an article purchased under the name of one of the preparations of the British Pharmacopœia being otherwise than of British Pharmacopœia quality. Queen Victoria in Council made an order on February 3, 1851, which required that:

"All and singular apothecaries and others, whose duty it is to compound medicines, or distil oils or waters, or make any other extracts within any part of . . . England . . . Wales, or Berwick-on-Tweed, they and every of them, immediately after the Pharmacopœia Collegii Regalis Medicorum Londinensis shall be printed and published, do not compound or make any medicine or medicinal receipt or prescription, or distil any oil or waters, or make any extract, that are or shall be in the said Pharmacopœia . . . mentioned or named in any other manner or form than is or shall be directed, prescribed, or set down by the said book, and according to the weights and measures that are or shall be therein limited, except it shall be by the special direction or prescription of some learned physician in that behalf; and Her Majesty doth hereby declare that the offenders to the contrary shall not only incur Her Majesty's just displeasure, but be proceeded against for such their contempt and offences to the utmost severity of the law."

This Order in Council is still in force.

Further, by the Medical Act of 1862, it is provided that the General Medical Council shall cause to be published a British Pharmacopœia; and Section 3 of the same Act provides that "the British Pharmacopœia when published shall for all purposes be deemed to be substituted throughout Great Britain and Ireland for the several above-mentioned Pharmacopœias, and any Act of Parliament, Order in Council or Custom relating to any of such last-mentioned Pharmacopœias shall be deemed after the publication of the British Pharmacopœia to refer to such Pharmacopœia."

Again, according to the Pharmacy Act of 1868, Section 15, "any person who shall compound any medicines of the British Pharmacopœia, except according to the said Pharmacopœia, shall for every such offence be liable to pay a penalty or sum of £5 . . . but nothing in this Act contained shall prevent any person from being liable

to any other penalty, damages, or punishment to which he would have been subject if this Act had not been passed." This last passage appears to tie a pharmacist down to compound his medicines according to the Pharmacopœia's directions *only*, unless by special directions of a medical man.

The foregoing statement represented my view of the question up to November last, when it was originally arranged that I should read a paper on the subject before this Society; but only a few days ago the question has received a stronger and far more authoritative treatment than I could pretend to give it. A week since an appeal case was heard by Mr. Justice Phillimore and Mr. Justice Bruce, sitting in the King's Bench Division of the High Court of Justice. It was a case in which a sample of mercurial ointment was purchased at Skipton, and on analysis by me was found to contain only 12·5 per cent. of mercury, whereas the mercurial ointment of the British Pharmacopœia contains not less than 48·5 per cent. The vendor was convicted, and he appealed to the High Court of Justice on the ground that he could not be convicted under Section 6, as the article was a compounded drug; and further contended that the usual practice was not to supply purchasers with ointment of British Pharmacopœia quality unless ordered by medical prescription. In a very full and lucid judgment Mr. Justice Phillimore held that the British Pharmacopœia was the legal authority for all preparations described therein. Unless those who sympathize with the appellant are prepared to take the case still higher, I presume the recent judgment will stand good for a time at least.

The present situation, to my mind, is very unsatisfactory. Numerous as are the defects in the Pharmacopœia, I have no sympathy with those who try to drag it down from its due position of authority, and degrade it to the standpoint of an irresponsible farrago of second-grade recipes. It is a great misfortune that the Pharmacopœia was not long ago formally recognised under the Adulteration Acts as the standard for drugs described in it; it would then have been easy to have had a schedule appended to the Act specifying certain articles as excluded from the general provision relating to drugs. The course thus suggested was adopted in the Bill laid by this Society before the Select Committee on Food Products Adulteration at their meeting in 1894, and if the advice of the Society had been accepted by the Government, much heart-burning and some injustice would have been prevented. At the present moment the position is most unsatisfactory, and I heartily sympathize with that large and respectable section of pharmacists who have habitually taken the British Pharmacopœia as their guide.

In order to place the law on a more satisfactory basis than exists at the present, I would suggest that a representative committee, including analysts, medical men, pharmacists, manufacturing chemists, and others interested, should endeavour to obtain an interview with the British Medical Council or the Pharmacopœia Committee of that body with the view of the immediate production of an appendix to the British Pharmacopœia, in which appendix titles and undesirable synonyms should be subjected to extensive correction. Subsequent steps would depend on the result of this interview.



## DISCUSSION.

Mr. CHATTAWAY thought that, owing to the comparative infrequency of the publication of the Pharmacopœia, its immediate revision would be very difficult to obtain, although such revision was undoubtedly much to be desired. It was to be hoped, however, that the recent High Court decision would have the effect of placing the question upon a more reasonable basis.

Mr. MARTIN PRIEST said that, although the High Court decision just referred to was distinctly a step forward, there still remained the question as to whether, for instance, a grocer selling camphorated oil or beeswax was bound to supply the Pharmacopœia articles. In the case of both camphorated oil and beeswax, it had been held in recent decisions that a grocer was not so bound. Now that the Pharmacopœia was actually established as a legal standard, there would seem to be only two courses open to the compilers of the next edition, namely, either to omit mention of all the characters and tests of the final products, limiting themselves to directions as to quantities and modes of preparation, or to give efficient tests. The former would be a retrograde step, for much assistance was afforded by those of the tests already given, which in justice must be said to be fairly correct. The adoption of the latter alternative would involve considerable research, but would be of very great advantage to all concerned.

Dr. DYER inquired on what authority Mr. Priest contended that the position of a grocer who sold adulterated camphorated oil was in any way different from that of a pharmacist who sold a similar article. The case was quite different from that of beeswax, which was an article used not only as a drug, but for other purposes as well. As a matter of fact, over and over again grocers who had dabbled in selling drugs and had supplied articles not in accordance with the demand of the purchaser, had been properly punished. The case of paregoric afforded a somewhat amusing instance of the liability of grocers dealing in drugs. If a grocer sold paregoric containing no opium, he might be prosecuted under the Sale of Food and Drugs Act; while if he sold paregoric containing opium he might be prosecuted under the Pharmacy Act.

Mr. PRIEST said that a case in reference to camphorated oil was recorded in the *Pharmaceutical Journal* for July 28, 1900, in which such a decision as he had referred to had been given by a magistrate.

Mr. THOMAS TYRER said that it was desirable to distinguish between galenical and non-galenical preparations. There could be no question whatever that a tincture ought to be of the proper alcoholic strength, although the extractive matters might vary within reasonable limits. In the case, however, of an article like Glauber's salt, it would be reasonable enough to stipulate for a given percentage of sodium sulphate—99, 98, or whatever it might be; but it really seemed absurd to covenant that it should have only the "slightest quantity of chlorides, etc." What was the meaning of the term "slightest"? It was highly important that alkaloidal preparations should be what they were represented to be, and he could not imagine that, in the light of modern scientific and technical knowledge, any alkaloid manufacturer would send out articles which were otherwise. Still, it would be wise to stipulate that



preparations of quinine, for instance, should contain definite proportions of the alkaloid. But the rest might be omitted: one did not expect to find arsenic in quinine, or selenium or tellurium in Glauber's salt. The essential question seemed to be as to whether there was any evidence of fraud, and for dealing with this a simple statement of the maximum that could be reasonably required under ordinary trade conditions was all that was necessary. As to mercury ointment, he had never made and had never been asked for the weaker kind, and he doubted whether much of it was sent out by the wholesale druggists. At any rate, it was in the vendor's power and his duty to label it properly, and he ought to have done so in his own interest, just as a "poison" label should be affixed to any article requiring it, whether such article was mentioned in the schedule or not. If, as had been suggested in the recent case, mercury ointment of full strength might produce therapeutical effects which were not contemplated, why not let the weaker article be prescribed in the Pharmacopœia? It would only be necessary to employ more of it in any given case. The presence of dangerous quantities of impurities such as arsenic in sodium phosphate was largely due to the prevailing craze for cheapness; but, on the other hand, it was manifestly impossible, in fairness to the purchaser, to insist that articles should be absolutely free from impurities of which, by the utmost refinements of analysis, small traces could be found in anything and everything. He therefore felt that the suggestion concluding the paper was most valuable; but, having regard to the manner in which offers of good work from such bodies as the British Pharmaceutical Conference had been dealt with, he was afraid that its early realization was improbable.

Mr. C. T. TYRER said that it seemed to him obvious that, if the Pharmacopœia was to be a standard, its own standards should be reasonable. Two points seemed likely to be productive of legal complications. The first was that manufacturers, while using the purest materials obtainable, often found themselves quite unable to meet the full requirements of the Pharmacopœia. Secondly, owing to the lack of definiteness which existed in regard to the determination of physical constants, the manufacturer tested in one way, the customer in another, and the analyst to whom the matter might be referred probably in another. He had lately compared certain articles with the standards laid down by seventeen different Pharmacopœias, and had found that, as regards strictness of definition, the British Pharmacopœia was considerably behind in the scale. Nobody would doubt the ability and good faith of its editor, but the system seemed to be radically at fault.

Mr. HEHNER said that if anything were likely to lead to the production of a perfect British Pharmacopœia, it would be the recent legal decision which had been referred to. As long as the Pharmacopœia was not considered seriously, there was no real incentive to make it perfect; but now that, as the result of a High Court decision, it had become definitely the standard by which the articles mentioned in it must be judged, it was to the interest of everybody—and it was bound to come to pass—that its standards should be made to meet the requirements of everybody. Mr. Chattaway had said that there was no chance of its immediate revision; but at the same time those who realized how much work was required to make it perfect would realize also that, if such a result was to be attained even within the next eight years, the work must be taken in hand soon.



Mr. JOHN WHITE said that there had lately grown up a pernicious custom of using the official names or official synonyms of the Pharmacopœia, but with some qualification. Not long ago he had met with a sample bought as camphorated oil, in the case of which the bottle was found to be labelled, in very small letters, with the words, "Camphor Embrocation," and underneath, in large type, "Used as Camphorated Oil." Another example was afforded by the use of the terms, "Sweet Spirit of Nitre, sp. gr. 0.850," and "Sweet Spirit of Nitre, sp. gr. 0.900." Such articles could only be sold with a view to defrauding the public, and it seemed to him that when a new Pharmacopœia was issued this point ought to be properly dealt with. He understood Mr. Tyrer to say that he did not think proceedings should be instituted in respect of any sample of a drug, except in the case of an article which, by reason of some deficiency in strength or quality, was sold with a view to defrauding the public; but surely Mr. Tyrer would admit that in many instances there must be, not only a minimum which ought to be reached, but also a maximum which should not be exceeded. If this principle were not admitted, purchasers of drugs would always be exposed to obvious and improper risks.

Mr. J. B. HARRISON said that in the colony of British Guiana, with which he was intimately connected, the practice was to admit at low rates of duty certain articles when imported as articles of the Pharmacopœia; but if, on analysis by the Government Analyst, such an article was found not to conform within reasonable limits to the requirements of the Pharmacopœia, it was treated as not being in consonance with the Pharmacopœia, and a much higher rate of duty was charged on it. Under those circumstances, at any rate, there could be no advantage in the direction of cheapness from the importation of inferior articles.

Mr. ALLEN said, in reply, in reference to Mr. Chattaway's remark, that his suggestion was that a representative committee should at once obtain an interview with the General Medical Council, or with the Pharmacopœia Committee of that body, urging the desirability of the immediate issue of a revised version of the Pharmacopœia, in which the titles and synonyms should be subjected to extensive correction; or, in the alternative, of an appendix containing the necessary modifications. An appendix to the Pharmacopœia, in fact, was badly needed in any case. This might possibly set the ball rolling, and might be the means of obtaining mitigation of what, he was sure, would be a hardship for a great many classes of persons. It would be a much larger task to carry out the suggestion of Mr. C. T. Tyrer. The revision of the standards and tests of the Pharmacopœia would occupy a considerable period of time, and it was to be hoped that the work involved would be suitably remunerated. He would certainly strongly protest against any unfortunate vendor being brought into a police court simply through a misunderstanding, or through having sold an article which he believed, but had no means of ascertaining, to be correct, as was the case with the unfortunate shopkeeper who sold sweet spirit of nitre without knowing that the strength of the article was likely to diminish on keeping. At the same time, he was rather surprised at the attitude adopted by some speakers and writers on that subject. The vendor should be educated; or, if he could not be educated, the trade in such articles should, as far as possible, be put into the hands of the educated pharmacist, who had means of knowing whether the articles he sold were of the proper



quality. To cry "stinking fish" was held to be no excuse for selling unsound meat; and if sweet spirit of nitre was really to be valued by its proportion of nitrous ether, it ought to be kept reasonably up to its proper strength. Pharmacists were too much inclined to be a law unto themselves. One man said that, as far as possible, he took care that all the articles he sold were of British Pharmacopœia quality. Another thought it was sufficient if all the articles with which he made up prescriptions were of British Pharmacopœia quality, the public being supplied with mixtures; and it was this latter class who sometimes got into trouble under the Sale of Food and Drugs Act. He sympathized very greatly with the majority of pharmacists, who, he believed, were doing their very best to maintain the honest traditions of their occupation. He could not help thinking that, if it were really desired, there ought to be a means for a united expression of views to the General Medical Council or its Pharmacopœia Committee. Owing to the recent High Court decision, pharmacists would be in difficulties if it were held that such articles as hard soap were drugs, and must always be in accordance with the Pharmacopœia. Some such articles (such as soda-water, vinegar, etc.) had been removed from the last edition. The time had come when pharmacists would begin to see that the contention that the Pharmacopœia was only intended for use in connection with physicians' prescriptions, and not for everyday use, would not hold water; but he believed that by far the greater number of pharmacists would be only too glad to approach the Medical Council, and to have the assistance of public analysts in attempting to arrive at some reasonable understanding on the question.

The PRESIDENT (Dr. Voelcker) observed that there seemed to be a general feeling of satisfaction that a decision had been given which recognised a certain authority in the matters referred to; but it was clear that the feeling was also general that that authority needed considerable improvement. He agreed with Mr. White in thinking that it was not sufficient to take Mr. Tyrer's view that a departure from the rules laid down should be regarded solely from the point of view of fraud. It certainly seemed very material that people should know the quality or strength of the drugs they used, and insure that the required effect would be adequately produced without being exceeded. It did not seem to be sufficient to say that, if a drug were of half strength only, it was only necessary to use a double quantity of it, for the effect might be very different. It would be much more satisfactory to know, not only that there had been no fraud, but that the production of the proper effect would be insured.

## THE ANALYSIS OF SOILS.

By J. ALAN MURRAY, B.Sc.

I SHALL be glad to be allowed to offer a few suggestions in regard to certain proposals contained in a valuable and timely paper—the report of a committee of the Agricultural Education Association—on uniformity in soil analysis, which appeared in the November issue of the ANALYST.

Whatever differences of opinion there may be as to the desirability of uniform



processes of analysis, it seems to me that uniformity is essential in the following points:

- (a) In taking the samples in the field;
- (b) In manipulation of the coarse samples in the laboratory;
- (c) In making the solutions;
- (d) In expressing the results;

and it is upon these points chiefly that I should like to offer some observations on the report of the committee.

With regard to the method of expressing the results, the committee recommend that results should be stated in percentages of the air-dry fine earth. I have, of course, no knowledge of what considerations weighed with the committee in coming to that conclusion; but I notice that the proposal was unfavourably commented on at the meeting, and it is quite clear that results so stated would not be mutually comparable.

It seems to me, however, that there are other and more serious objections to this popular convention. First, it should be kept in view that the results may often have to be interpreted, not by chemists, but by agriculturists; and it is of the greatest importance that they should be stated in some such plain and simple way as to afford at a glance trustworthy information as to the stock of the various substances in the whole soil. It cannot be maintained that a statement of percentage in the fine earth, air-dry or dry, does this: on the contrary, such information can only be deduced by long and troublesome calculations, even when the other necessary data are given, and too often they are not. For example, it may happen that 3, or 30, or 90 per cent. of the total mass of the soil may be made up of stones; the specific gravity of the fine earth itself, and still more the density of packing, varies enormously. It is apparently to be left to the discretion of each chemist whether this information shall be included in his report or not, and without such information a statement of percentages means little or nothing.

Secondly, the figures showing the percentages of the most important ingredients—phosphoric acid, potash, etc.—in the fine earth are, as a rule, inconveniently small, and the importance of those of the third decimal place may easily be unappreciated. Thus, the percentage of total phosphoric acid is often represented by figures of smaller value than 0.1, and that of the “available” portion by figures less than 0.01; and yet 0.001 per cent., which to many people might seem almost a negligible quantity, would, in most cases, be equivalent to about 20 pounds of phosphoric acid per acre, and would require over  $1\frac{1}{2}$  cwt. of superphosphate to supply it as manure.

Thirdly, the total amount of water present in a soil at the time of sampling is naturally extremely variable; and though it depends largely upon circumstances beyond control, and which may for many purposes be regarded as accidental, it is by no means devoid of interest and importance, especially if the rainfall in the district for the few days immediately preceding sampling be known or can be ascertained. The fact that it cannot conveniently be included with the other substances in the total of 100 per cent. must therefore be regarded as an objection to the plan of rendering results in terms of percentages rather than as a justification for ignoring the water altogether.



Finally, a plant's chances of obtaining its necessary supplies of any substance depend, not upon the amount of that substance in a unit of mass, but in a unit of volume; and, consequently, since a given volume of one soil may in extreme cases weigh perhaps twice as much as an equal volume of another, a simple statement of percentages does not afford a reliable basis for comparison of degrees of fertility of different soils.

The remedy for this last-mentioned objection appears simple—namely, to express the results of analyses in terms of the quantities per unit of volume of the soil *in situ*.

Thus, the quantities of potash, of phosphoric acid, etc., in a given volume of soil form separate statements independent of each other, of the quantities of water and of everything else, so that the quantity of water may be included or omitted without in any way affecting the figures relating to the other ingredients.

A report in these terms would yield, on multiplication of the figures by some simple factor, an expression of the quantities per acre, and by choice of suitable units it might be rendered in figures of any size we please.

The question of the particular units to be chosen is, of course, a matter of minor importance; but, all things considered, it would probably be hard to find any with more to recommend them than ounces per cubic foot. These are common English standards, with which every farmer is familiar; they are easily converted to pounds and acres respectively, and they produce figures of about ten times the magnitude of those expressing the same results in terms of percentages, so that it would only be necessary to carry the figures to the third decimal place instead of the fourth. Even the fact that the measurements would in most cases be made in the units of the metric system offers no obstacle, for, as it happens, the relation of the gramme to the ounce is practically the same as that of the cubic decimetre to the cubic foot; and hence, if results expressed in terms of grammes per cubic decimetre be simply read as ounces per cubic foot, the error involved is not greater than 1 in 700—a quantity which for practical purposes might be neglected. In other words, the exact relation between grammes per cubic decimetre and ounces per cubic foot is as 700 to 701, which gives the factor 1.00143 for converting the former to the latter in cases where great accuracy is required.

In order to give effect to the suggestion, however, it would be necessary to determine the mass of some definite volume of the soil *in situ* by means of a specially constructed sampler, as recommended by the committee, or in some other way. The sampler, if used, need not be exactly a cubic foot or a cubic decimetre, but its volume content must be accurately known. A cylinder 9 inches deep by 3 inches in diameter holds approximately a cubic decimetre, and is a convenient instrument in many ways, though it cannot be used in every case. A wider one is necessary for very stony soils, and a longer or shorter one where the soil is to be sampled at different depths.

The depth of soil sampled is very important in this connection, as it determines the factor for converting ounces per cubic foot into pounds per acre. Thus, if the depth be 12 inches, the factor will be  $43560 \times \frac{1}{16} = 2722$  nearly; but if the depth be 9 inches only, the surface area in the cubic foot will be greater, and the factor in that case would be  $43560 \times \frac{1}{16} \times \frac{3}{4} = 2042$  very nearly. In the course of the discussion which followed the reading of the paper, Dr. Dyer in speaking of the proposal of



the committee that soils should be sampled to a depth of 9 inches, mentioned that Sir Henry Gilbert now considered about 8 inches would, as a rule, be more suitable, and he suggested one-fifth of a metre as a convenient international standard. I do not propose to discuss in this connection what depth would be most suitable under ordinary or any circumstances; but it occurred to me at the time that, if the fifth of a metre were adopted, it would fall in very conveniently with the suggestion I have ventured to put forward.

It will, further, be seen that the proposal to state the results in quantities per unit of volume of the soil *in situ* would involve a large departure in the methods of treating the samples in the laboratory from those at present commonly adopted and recommended by the committee. Thus, a sample taken in the manner and for the purpose referred to might be accepted as representative of the soil of the field or part of the field, or it might be rejected as the reverse; but in either case it would have to be accepted or rejected as a whole, and its properties would have to be determined in the mass as it occurs—*i.e.*, without any preliminary process of picking or sifting, or any other arbitrary method of separating the fine and coarse particles. For it is evident that a statement that a cubic foot of soil *in situ* contains a certain quantity of any ingredient soluble in concentrated or dilute acids implies that a representative portion of such soil as it occurs *in situ* has been submitted to the action of the solvent.

It may be argued, of course, that the coarser particles of the soil do not, within a measurable time, affect its chemical properties; but this, even if it were true, is not a satisfactory reason for excluding these particles from the action of the reagents, but quite the reverse. The roots of plants are commonly found adhering very closely to the stones. It is possible that the plants derive merely mechanical advantage in this way, though the facts, so far as they are known, point in the opposite direction; but if the roots extract nothing from the stones, then neither will those reagents with which we endeavour to imitate their action, if they do imitate it; and if the roots do obtain nourishment from the stones, then the stones should be treated exactly like the other particles of the soil.

The arbitrary use of a sieve of certain dimensions for the purpose of discriminating what is fine and what is coarse material—*i.e.*, what is soil and what is not—probably does not commend itself greatly even to the members of the committee who recommend it, and it is certainly much easier to excuse it as necessary than to defend it as reasonable and satisfactory. Probably few persons could be found to approve of manipulating a sample of any other kind in a similar way; but without doubt, in the case of soils, the line must be drawn somewhere. Thus, a sample might be drawn containing a stone as big as a man's head, and perhaps only as much fine stuff as would fill a teacup; a sample might be drawn containing the stump of a tree; but such samples would not be representative, and would therefore be rejected altogether. It may be taken for granted, then, that some method of deciding what substances might be legitimately included as representative in a sample of soil is indispensable, but it does not follow that it should be the arbitrary one at present in general use. On the contrary, it seems to me that each case should be judged separately and on its own merits, on the principle that all those stones, etc., of whatever size, which are

more or less uniformly distributed throughout the mass of the soil should be regarded as essential parts of it, and that those which are exceptional in point of size or in other respects should be regarded as accidental, when, of course, no sample containing them could be accepted.

It is to be observed that this principle, should it be accepted, does not leave the decision to the somewhat haphazard method of simple inspection—though even that would in most cases form a sufficiently reliable guide—because in estimating the mass of a cubic foot it is always necessary to make several trials, and, under ordinary circumstances, the weights will usually be found to differ only by a few grammes; but should an exceptionally large stone or other accidental substance be included in one of the samples so drawn, the weight of that one will be found to differ very widely from the average of the others, and the sample would therefore be rejected.

The plan I have adopted in taking a portion of the soil for analysis has been to disintegrate the various masses of wet soil taken out by the sampler with the fingers, mix them as thoroughly as possible, and bring the lot together in a heap; then with a long-bladed spatula divide off such a portion as I reckoned would constitute a fair sample of the heap, and sweep it into a weighed beaker, and weigh again to find the quantity of soil taken. In most cases I found that about 200 grammes was sufficient, but under certain circumstances it was necessary to take larger quantities. It is, of course, necessary at the same time to set aside a portion to air dry, and afterwards to dry it thoroughly, in order to determine the moisture. Any errors which might be involved by the rougher method of sampling would probably be more than compensated by the difference in the size of the portions taken. The exact nature of the difficulties to be encountered and the best methods of dealing with them could, however, probably be most satisfactorily dealt with by discussion in committee.

I have found it easier to get the solvent thoroughly mixed with the large mass of soil, and in one case I found a considerably larger proportion of “available” phosphoric acid extracted when the sample was treated in the undried condition. Dehydration of hydrated phosphates might possibly account for this; but whatever was the cause, the point is one of great importance, and I regret that I have been so far unable to pursue my investigations in regard to it.

I think the scheme of the committee would also be greatly improved if it included a recommendation that the amount of humus should be deduced from the determinations of the organic carbon. The loss on ignition, after drying at  $100^{\circ}\text{C}$ ., can rarely correspond to the amount of humus, for it includes the combined water of clay, etc. In a soil which I examined recently I found only about 0.4 per cent. of organic carbon and no carbonates at all, and yet this sample lost nearly 5 per cent. on ignition after drying. In the course of certain other experiments, I found that, as a rule, the organic carbon corresponds to about half the weight of the humus present; but the relation is probably not constant, and the matter requires further investigation.



## REGULATIONS FOR MILK AND CREAM.

REPORT OF THE DEPARTMENTAL COMMITTEE APPOINTED BY THE BOARD OF AGRICULTURE TO INQUIRE INTO AND REPORT UPON THE DESIRABILITY OF REGULATIONS (UNDER SECTION 4 OF THE SALE OF FOOD AND DRUGS ACT, 1899) FOR MILK AND CREAM.

At the beginning of 1900 the Board of Agriculture, in pursuance of their powers under Section 4 of the Sale of Food and Drugs Act, 1899, appointed a Departmental Committee to inquire and report what regulations, if any, should be made in the case of milk and cream for determining what deficiency in the normal constituents, or what addition of extraneous matter, should be held to raise a presumption that the milk or cream was not genuine.

This Committee consisted of the following members: Lord Wenlock, G.C.S.I., G.C.I.E. (Chairman); Mr. George Barham (Dairy Supply Co., London); Mr. George Cowan (Dairy Farmer, Wigtownshire, N.B.); Major Craigie (Assistant-Secretary Board of Agriculture); Mr. S. W. Farmer (Dairy Farmer, Little Bedwyn, Wilts); Dr. Shirley F. Murphy (Medical Officer, London County Council); Professor Thorpe, F.R.S. (Principal Chemist, Government Laboratories); Dr. J. A. Voelcker (Consulting Chemist, Royal Agricultural Society of England); with Mr. R. H. Rew (Board of Agriculture) as Secretary.

The Report of the Committee was made to the Board of Agriculture, and, having been presented to both Houses of Parliament, has now been published, together with the Minutes of Evidence taken before the Committee.

The Committee held fifteen sittings for the purpose of taking evidence, and examined forty-nine witnesses. Of these, fifteen were analysts, and included names so well known as Mr. A. H. Allen, Mr. E. J. Bevan, Sir Charles Cameron, Mr. C. E. Cassal, Dr. Dyer, Mr. W. W. Fisher, Dr. Alfred Hill, Mr. G. Lewin, Mr. F. J. Lloyd, and Mr. H. D. Richmond. Four witnesses were Medical Officers of Health (for Birmingham, Glasgow, Manchester and Reading respectively); while the views of the Dairy Trade, the milk-producing farmers, agricultural societies, and Dairy Farmers' Associations, were all fully represented, and the evidence comprised in a Blue Book of 450 pages.

The Report itself is in two parts, the majority report, signed by seven of the eight members, comprising thirty-three pages. It is subject, however, to a reservation by one of the signatories, Mr. S. W. Farmer, who is in favour of "seasonal limits." The minority report, which extends to thirty-six pages, and traverses the whole ground of the majority report, is signed by Mr. George Barham alone.

The subjects, considered in order, were: (1) Whole milk; (2) skimmed or separated milk; (3) condensed milk; (4) cream. There was a general consensus of opinion that there ought to be regulations laid down for determining when milk and cream should be considered genuine, though some few witnesses, mostly representatives of dealers in and distributors of milk, thought that no such regulations were necessary. The variability of the so-called "standards" adopted in different

towns and by different analysts was brought out, and a general desire expressed that uniformity should be arrived at.

The Report next deals with the various difficulties standing in the way of fixing limits. "Minimal limits," it may be said, is the sense in which the Committee interpret the expression "standard" now so generally used. The causes of variability in the quality of milk, viz., the land, the method of feeding (the influence of which is not regarded as definite), the breed, condition, period of lactation, interval between times of milking, the time of year, etc., are successively dealt with. The "standards" adopted in other countries are set out, but are not considered to have much bearing on the subject immediately in hand. The question is then discussed very fully whether "local limits," applying to particular districts, or "seasonal limits," applying to particular times of the year, could be adopted; and whether milk could be "graded" according to quality, and sold as of certain grades and at corresponding prices. The Report shows the impracticability, in the Committee's opinion, of all these suggestions, though the question of "seasonal limits" called for, as it merited, very careful consideration, and it was on this point alone that Mr. Farmer, one of the Committee, found it necessary to append his reservation when signing the general Report. The general feeling of the Committee was that though, as a rule, it would be in the months of May and June that milk would be somewhat lower in quality, yet there might be great variation in particular years, and that any concession given for certain months and particular cases would lead to much greater difficulties as regards the administration of justice, while the difficulties of the producer could be met partly by his own efforts in insuring regularity and uniformity of supply, and partly by the reasonable application of the proposed "limits" by those responsible for administering the Act.

In dealing next with the particular "limits" to be adopted, the Committee have clearly been guided mainly by the views of those who—such as the analysts—have no personal interest in the matter, but are conversant with the chemical examination of milk as supplied to the public and during all times of the year. It is pointed out that while farmers generally favoured a limit of 3 per cent. of fat, and in several cases expressed a preference for a higher limit, the representatives of the traders in milk, almost without exception, advocated a low "standard" or none at all. A large number of statistical tables were put in giving the results of analyses of samples of milk taken over considerable periods and as supplied to different dairies, creameries, etc., over the country, and the Committee arrived at the conclusion that the milk produced for sale, as such, in this country contains, on an average, from 12·5 to 12·8 per cent. of total milk-solids, comprising from 3·7 to 4 per cent. of milk-fat. After weighing carefully the evidence given them, and especially that of the analysts, they came to the conclusion that any milk the total milk-solids of which fall below 12 per cent. should be made the subject of "further inquiry." If it should then be found to give less than 3·25 per cent. of milk-fat, it is recommended that a presumption be raised—until the contrary is proved—that it has been mixed with separated milk or water; and, if the non-fatty milk-solids are less than 8·5 per cent., the presumption that it has been mixed with water shall arise.

Accordingly, the governing factor in the first instance is to be that of a limit of



12 per cent. of total milk-solids, and it is only when a milk fails to give this percentage that it is further inquired into, and the other factors, viz., 3·25 per cent. of fat and 8·5 per cent. of non-fatty solids, come into force.

It is well that this should be clearly explained, as a good deal of misapprehension appears to exist on the point.

The Report next puts out certain suggestions for the better administration by local authorities of their powers under the Act, whereby the interests of the honest trader may be safeguarded. Uniformity in methods of taking samples and of analysis is advocated, as well as the official standardizing of "mechanical test" bottles.

In regard to hand-skimmed and machine-separated milk the Committee think that there is no necessity to make a distinction between them, but that both should be sold under a "limit" of 9 per cent. of total milk-solids. They further give their opinion that it would be very desirable to identify or "ear-mark" all separated milk. The subject of Condensed Milk also occupied the attention of the Committee, and there was strong expression as to the necessity of limiting the amount of sugar used in these preparations, and to the securing that the milk, when diluted with water to the extent stated on the label, should be judged by the limits for ordinary milk. It was recommended, therefore, that condensed milk should contain not less than 10 per cent. of fat or 25 per cent. of solids-not-fat.

Lastly, as regards cream, the Committee did not advocate the fixing of any definite limits of fat, etc., but they considered that cream might well be sold as of different qualities, at corresponding prices. They advised, however, that any artificial thickening of cream should be considered as an adulteration.

To the five main recommendations which they give in their Report the Committee append seven minor suggestions as expressions of opinion, and the whole are set out as follows:

#### RECOMMENDATIONS.

114. The Committee beg to make the following recommendations:

- I. That regulations under Section 4, of the Food and Drugs Act, 1899, be made by the Board of Agriculture with respect to Milk (including condensed milk) and Cream.
- II. (a) That in the case of any milk (other than skimmed, separated, or condensed milk) the total milk-solids in which on being dried at 100 degrees Centigrade do not amount to 12 per cent. a presumption shall be raised, until the contrary is proved, that the milk is deficient in the normal constituents of genuine milk.
- (b) That any milk (other than skimmed, separated, or condensed milk) the total milk-solids in which are less than 12 per cent., and in which the amount of milk-fat is less than 3·25 per cent., shall be deemed to be so deficient in milk-fat as to raise a presumption, until the contrary is proved, that it has been mixed with separated milk or water, or that some portion of its normal content of milk-fat has been removed. In calculating the percentage amount of deficiency of fat the analyst shall have regard to the above-named limit of 3·25 per cent. of milk-fat.

- (c) That any milk (other than skimmed, separated, or condensed milk) the total milk-solids in which are less than 12 per cent., and in which the amount of non-fatty milk-solids is less than 8·5 per cent., shall be deemed to be so deficient in normal constituents as to raise a presumption, until the contrary is proved, that it has been mixed with water. In calculating the percentage amount of admixed water the analyst shall have regard to the above-named limit of 8·5 per cent. of non-fatty milk-solids, and shall further take into account the extent to which the milk-fat may exceed 3·25 per cent.
- III. That the artificial thickening of cream by any addition of gelatin or other substance shall raise a presumption that the cream is not genuine.
- IV. That any skimmed or separated milk in which the total milk-solids are less than 9 per cent. shall be deemed to be so deficient in normal constituents as to raise the presumption, until the contrary is proved, that it has been mixed with water.
- V. That any condensed milk (other than that labelled "machine-skimmed milk" or "skimmed milk," in conformity with Section 11 of the Food and Drugs Act, 1899) in which either the amount of milk-fat is less than 10 per cent., or the amount of non-fatty milk-solids is less than 25 per cent., shall be deemed to be so deficient in some of the normal constituents of milk as to raise the presumption, until the contrary is proved, that it is not genuine.

115. The Committee beg further to submit the following expressions of opinion on points raised before them in evidence :

- (a) That it is desirable to call the attention of those engaged in the administration of the Food and Drugs Acts to the necessity of adopting effective measures to prevent any addition of water, separated or condensed milk, or other extraneous matter, for the purpose of reducing the quality of genuine milk to any limits fixed by regulation of the Board of Agriculture.
- (b) That it is desirable that steps should be taken with the view of identifying or "ear-marking" separated milk by the addition of some suitable and innocuous substance, and by the adoption of procedure similar to that provided by Section 7 of the Food and Drugs Act, 1899, in regard to margarine.
- (c) That it is desirable that, so far as may be found practicable, the procedure adopted in collecting, forwarding, and retaining pending examination, samples of milk (including condensed milk) and cream under the Food and Drugs Acts should be uniform.
- (d) That it is desirable that, so far as may be found practicable, the methods of analysis used in the examination of samples of milk (including condensed milk) or cream taken under the Food and Drugs Acts should be uniform.
- (e) That it is desirable in the case of condensed milk (other than that labelled "machine skimmed milk" or "skimmed milk," in conformity with Section 11 of the Food and Drugs Act, 1899), that the label should state



the amount of dilution required to make the proportion of milk-fat equal to that found in uncondensed milk containing not less than 3·25 per cent. of milk-fat.

- (f) That it is desirable in the case of condensed whole milk to limit, and in the case of condensed machine-skimmed milk, to exclude, the addition of sugar.
- (g) That the official standardizing of the measuring vessels commercially used in the testing of milk is desirable.

Mr. S. W. Farmer, though he signs the Report generally, makes a reservation, as stated, in regard to "seasonal limits." He holds that 12 per cent. of total solids is too low for six months of the year, and that 3·25 per cent. of fat is too high for the spring months. He would like to see seasonal limits of 3 per cent. of fat and 8·5 per cent. of non-fatty solids for March, April, May and June, and 3·25 per cent. of fat and 8·5 per cent. of non-fatty solids for the rest of the year.

Mr. George Barham, in his minority report, differs entirely from his colleagues on the main points regarding whole milk. He would advocate a limit of total milk-solids of 11·75 per cent., with 3 per cent. of fat in the months of July to February inclusive, lowered to 2·75 per cent. of fat in the months of March to June inclusive, with a limit of 8·5 per cent. of non-fatty solids, in both cases alike.

In the case of skimmed or separated milk, Mr. Barham recommends a limit of 8·75 per cent. total solids instead of the 9 per cent. recommended in the majority report.

The Report, price 7½d., can be obtained from Messrs. Eyre and Spottiswoode, East Harding Street, Fleet Street, E.C.; or other Government publishers; as also the Minutes of Evidence, Appendices, etc., price 3s. 8d.

## ABSTRACTS OF PAPERS PUBLISHED IN OTHER JOURNALS.

### FOODS AND DRUGS ANALYSIS.

**Ramschen's Method of estimating Fat in Milk.** R. Lézé. (*Repert. Pharm.*, 1901, xiii. [3], 1; through *Chem. Zeit. Rep.*, 1901, 52.)—This process has been investigated by Fouard, and the present author considers it very useful. The reagent consists of 8 grammes of potassium hydroxide, 10 c.c. of ordinary ammonia, 55 c.c. of ethyl alcohol, and 15 c.c. of amyl alcohol. When the potash has dissolved, the whole is diluted with ammonia to 100 c.c. Thirty-six c.c. of milk and 10 c.c. of the reagent are brought into a flask holding 50 or 60 c.c., the neck of which is graduated. The flask is placed on a boiling water-bath, and gently agitated at intervals for about twelve minutes. Hot water is then added till the liberated fat collects in the graduated portion of the neck, and its volume is read off at a temperature of 40° C. At this point the specific gravity of butter-fat is about 0·90.

F. H. L.

The Composition of the Juice of Certain Fruits. Truchon and Martin-Claude. (*Journ. Pharm. Chim.*, 1901, xiii., 171-176.)—The authors have analysed the juices of several kinds of fruit intended for the manufacture of syrups, etc., and have obtained the following results, expressed in grammes per litre :

| Juice.                     | Specific Gravity | Invert Sugar. | Saccharose. | Saccharimeter, degrees. |                  | Acidity as Tartaric Acid. | Substances precipitated by Alcohol. | Mineral Matter. | K <sub>2</sub> O. | P <sub>2</sub> O <sub>5</sub> . | Citric Acid. | Tartaric Acid. |
|----------------------------|------------------|---------------|-------------|-------------------------|------------------|---------------------------|-------------------------------------|-----------------|-------------------|---------------------------------|--------------|----------------|
|                            |                  |               |             | Before Inversion.       | After Inversion. |                           |                                     |                 |                   |                                 |              |                |
| Cherry (early)             | 1040.4           | 83.60         | —           | −9°                     | −9°              | 4.95                      | 3.40                                | 3.00            | 0.44              | 0.33                            | slight trace | present        |
| Cherry (in season) ...     | 1055.4           | 96.49         | —           | −16° 5'                 | −16° 5'          | 8.46                      | 2.40                                | 3.88            | 0.97              | 0.21                            | —            | —              |
| Early Strawberry ...       | 1026.2           | 45.18         | —           | −7°                     | −7°              | 9.15                      | 10.00                               | 5.96            | 0.46              | 0.60                            | present      | trace          |
| Strawberry (in season) ... | 1048.2           | 99.98         | —           | −21°                    | −21°             | 11.52                     | 13.80                               | 5.72            | 0.97              | 0.26                            | —            | present        |
| Raspberry ...              | 1050.3           | 88.19         | —           | −15°                    | −15°             | 17.82                     | 9.60                                | 4.32            | 0.86              | 0.32                            | —            | —              |
| Gooseberry: Red... ..      | 1040.0           | 63.68         | —           | −11°                    | −11°             | 28.50                     | 8.60                                | 5.40            | 1.25              | 0.47                            | —            | —              |
| Gooseberry: Green ...      | 1049.8           | 87.43         | —           | −15° 3'                 | −15° 3'          | 25.65                     | 7.20                                | 4.44            | 1.01              | 0.25                            | —            | —              |
| Black Currant              | 1065.5           | 116.60        | —           | −25°                    | −25°             | 31.44                     | 10.80                               | 7.20            | 1.63              | 0.66                            | —            | present        |
| Peach ...                  | 1054.0           | 33.50         | 19.80       | +2° 5'                  | −14°             | 6.84                      | 7.60                                | 4.70            | 0.76              | 0.46                            | —            | —              |
| Pear ...                   | 1055.0           | 85.80         | —           | −10° 2'                 | −10° 2'          | 2.04                      | 2.60                                | 3.56            | 1.68              | 0.16                            | —            | —              |
| Quince ...                 | 1048.0           | 75.90         | —           | −7° 4'                  | −7° 4'           | 9.60                      | 4.60                                | 4.20            | 1.81              | 0.37                            | —            | present        |
| Apple ...                  | 1068.0           | 102.80        | 6.60        | −8°                     | −13° 5'          | 7.44                      | 6.80                                | 3.72            | 2.09              | 0.19                            | —            | —              |

Analyses of the entire fruits (pulp and juice) gave the following results, calculated on 100 grammes :

| Fruit.         | Invert Sugar, per Cent. | Saccharose, per Cent. | Saccharimeter, degrees. |                  | Mineral Matter, per Cent. | K <sub>2</sub> O, per Cent. | P <sub>2</sub> O <sub>5</sub> , per Cent. | Citric Acid. | Tartaric Acid. |
|----------------|-------------------------|-----------------------|-------------------------|------------------|---------------------------|-----------------------------|-------------------------------------------|--------------|----------------|
|                |                         |                       | Before Inversion.       | After Inversion. |                           |                             |                                           |              |                |
| Apricots ...   | 2.64                    | 4.15                  | +29° 6'                 | −4° 8'           | 0.59                      | 0.126                       | 0.05                                      | present      | present        |
| Greengages ... | 8.80                    | 0.80                  | −7                      | −14              | 0.57                      | 0.115                       | 0.06                                      | —            | trace          |
| Mirabelles ... | 6.57                    | 3.04                  | +5                      | −20              | 0.59                      | 0.217                       | 0.07                                      | —            | —              |

None of the juices examined contained glucose.

In testing for salicylic acid, 100 c.c. of the sample were diluted with the same volume of water, and about 2 c.c. of a concentrated solution of ferric chloride added. The liquid was shaken until homogeneous, about 10 grammes of calcium carbonate added, the precipitate allowed to settle, the filtrate extracted with ether, and the residue from the extract tested with dilute ferric chloride solution. Without this treatment, several of the juices, notably that of the strawberry, gave colour reaction in the absence of salicylic acid.

Of the natural colouring matters, only that of the peach was soluble in ammoniacal amyl alcohol, yielding a yellowish-red colour, which, however, did not dye silk.

The authors have proved that the natural colours cannot be confounded with coal-tar or other added colouring matters, such as archil, logwood, cochineal, etc.

C. A. M.



**The Composition of Belgian Butter.** J. Wauters. (*Bull. de la Soc. Belge*, 1900, xiv., 453-470.)—In discussing the new Belgian law for the prevention of the adulteration of butter with margarine, the author gives a résumé of the investigation made by the Belgian Government as to the composition of the butter manufactured in that country.

The butter manufactured, in most cases under the supervision of an inspector, by fourteen co-operative dairies and thirty-three wholesale firms, representative of every part of Belgium, was analysed every fifteen days for a year (1897-98) by two different chemists. The results thus obtained were as follows:

In the case of the fourteen co-operative dairies, 330 samples were analysed between October, 1897, and October, 1898, and the following variations observed: Specific gravity, 0.864 to 0.8686; refractive index (Abbe-Zeiss), 40.2 to 46.7; Meissl value, 26.07 to 34.50; Hehner value, 85 to 89.65.

During the same period 755 samples taken from the wholesale firms were analysed, with the following results:

|                      |     |     |                                           |           |
|----------------------|-----|-----|-------------------------------------------|-----------|
| Specific gravity ... | ... | ... | 0.8636 to 0.8684                          |           |
| Abbe-Zeiss index     | ... | ... | 40 to 47                                  |           |
|                      |     |     | (26 to 36.85 (one 40.35) for 693 samples. |           |
|                      |     |     | 25.0 to 25.84                             | for 26 "  |
| Meissl value ...     |     |     | 24.0 to 24.96                             | for 16 "  |
|                      |     |     | 23.08 to 23.84                            | for 9 "   |
|                      |     |     | 19.8 to 23.0                              | for 11 "  |
|                      |     |     | 85.25 to 89.0                             | for 609 " |
| Hehner value ...     |     |     | 89.0 to 89.90                             | for 139 " |
|                      |     |     | 90.00 to 91.0                             | for 7 "   |

Similar investigations were also made with the butter from special districts, and with that of special firms which had given abnormal results, the analyses being continued to the beginning of 1900. The majority of these samples gave results analogous to the majority of those shown in the preceding tables.

The Commission came to the conclusions that as a rule the butters giving abnormal figures were derived from small dairies; that these abnormalities were of most frequent occurrence from August to December; and that they disappeared during the months of March, April, and May.

C. A. M.

**The Detection of Cinnamic Acid in the Presence of Benzoic Acid.** A. Jorissen. (*Ann. de Chim. Anal.*, 1901, vi., 41-43.)—When cinnamic acid is oxidized by a suitable reagent, it is converted into benzaldehyde, which can readily be recognised by its odour.

In the case of official benzoic acid, 0.1 gramme is dissolved in 5 c.c. of boiling water, and 0.1 gramme of potassium permanganate added.

A second test of the same kind is based on the combined action of uranium salts and light upon cinnamic acid. A few decigrammes of the sample are mixed with a few c.c. of a 5 per cent. solution of uranium acetate or nitrate, which are then exposed to the light in a stoppered flask. After some minutes a brown deposit of uranous oxide (?) is formed, and the odour of benzaldehyde will be observed.

C. A. M.

**Valuation of Jalap Tubers.** O. Schweissinger. (*Pharm. C. H.*, 1901, xlii., 1; through *Chem. Zeit. Rep.*, 1901, 14.)—Ten grammes of the finely-powdered roots are extracted with spirits of wine for twenty-four hours at a temperature of 30° C., shaking at intervals. Fifty c.c. of the liquid are drawn off, and the solvent is evaporated. The resin is then washed with warm water as long as colouring-matter is removed, and the residue is dried. The results are concordant. F. H. L.

### TOXICOLOGICAL ANALYSIS.

**A Test for Picrotoxin.** S. S. Minovici. (*Ann. Pharm.*, 1901, vii., 1; through *Chem. Zeit. Rep.*, 1901, 52.)—Anisaldehyde is a very delicate and characteristic reagent for picrotoxin, indicating its presence not only when alone, but also in the starchy mass of the fruit. A drop of sulphuric acid is added to the sample, and after two minutes, when the saffron-yellow colour has become distinct, one drop of a 20 per cent. solution of anisaldehyde in absolute alcohol is introduced. A dark-blue violet ring is produced, which soon changes to a permanent blue. The test can also be applied to dilute solutions in chloroform, alcohol, or water; but the liquids should be warmed. The limit of sensitiveness is 1 : 2,000, or even 1 : 5,000. Many other glucosides and alkaloids give obscure and unimportant colour reactions with the reagent; while convolvulin yields a cherry-red, saponin a red-brown, aconitine a pale rose, and veratrine a blue-red or indigo-blue tint. F. H. L.

**Identification of Tropine.** S. Vrevin. (*Ann. Pharm.*, 1900, vi., 511; through *Chem. Zeit. Rep.*, 1901, 12.)—The most characteristic property of tropine is the ease with which it yields crystalline double salts, especially double chlorides with platinum and gold. With cadmium potassium iodide in a weak acid solution tropine gives a crystalline precipitate consisting of hexagonal plates. The compound is relatively soluble in water, and strong solutions are necessary to obtain it; it melts above 200° C. to a clear liquid. With a faintly acid solution of phosphomolybdic acid tropine yields a yellowish precipitate of microscopic needles entangled together. On warming, this compound turns green and then decomposes without melting. These two reactions readily distinguish tropine from the four principal mydriatic alkaloids of the *Solanaceae*, as they give with cadmium potassium iodide either amorphous precipitates or crystalline ones of quite different appearance, and with phosphomolybdic acid they yield amorphous precipitates only. F. H. L.

### ORGANIC ANALYSIS.

**On the Separation of Oleic Acid from other Unsaturated Acids.** J. Lewkowitsch. (*Zeit. für Untersuch. der Nahr. und Genussmittel*, 1901, iv., 62.)—The author, replying to Farnsteiner (*Zeit. für Untersuch. der Nahr. und Genussmittel*, 1900, iii., 537-539; ANALYST, 1900, 293), states that in 1899 experiments were undertaken in his laboratory with the object of testing Farnsteiner's method, and that these



proving unsatisfactory, he privately communicated the results to Farnsteiner. At the same time he sent him a sample of the oleic acid he produces on a large scale for examination by his method. As Farnsteiner found in this sample only 23·5 per cent. of oleic acid, the author considers his strictures upon Farnsteiner's method were fully justified.

H. H. B. S.

**A Reply to the foregoing Remarks of Lewkowitsch. K. Farnsteiner.** (*Zeit. für Untersuch. der Nahr. und Genussmittel*, 1901, iv., 63-65.)—The author contends that Lewkowitsch has misunderstood his meaning. His method was only intended as a test for the presence of oleic acid, and was so described in the title of the paper. He never at any time claimed for it that it was a complete method adapted for general use for the separation of oleic acid from other unsaturated acids. He, however, explains the fact that he found only 23·5 per cent. of oleic acid in the sample sent him by Lewkowitsch by supposing that the process used by him in its preparation—heating mutton-fat under pressure with lime and water—does not yield a pure product.

H. H. B. S.

**The Characters of Oil of Akee. W. Garsed.** (*Pharm. Journ.*, 1900, 691.)—The oil is a yellow non-drying fat consisting, at ordinary temperatures, of a liquid and of a solid granular portion. It has a peculiar odour, and a somewhat unpleasant taste. It consists of about 50 per cent. liquid, and 40 per cent. solid glycerides, and 10 per cent. of free fat-acids. The acids contain oleic acid, and either a mixture of, or near homologues of, palmitic and stearic acids. In the following table the constants of akee oil are compared with those of olive oil and palm oil:

|                       | Akee Oil.          | Palm Oil.                                      | Olive Oil.            |
|-----------------------|--------------------|------------------------------------------------|-----------------------|
| Specific gravity ...  | 99°-100° C., 0·857 | 98°-99° C., 0·8586<br>(Water at 15·5° C. = 1.) | 15·5° C., 0·914-0·917 |
| Melting-point ...     | 25°-35°            | 27°-42·5°                                      | 2·5°                  |
| Solidifying-point ... | 20°                | 21°-27°                                        | + 2° to - 4°          |
| Hehner value ...      | 93                 | 94·2-97                                        | 95·4                  |
| Saponification value  | 194·6              | 196·3-202·5                                    | 185-196               |
| Reichert value ...    | 0·9                | 0·5                                            | 0·3                   |
| Iodine value ...      | 49·1               | 51-52·4                                        | 81·6-84·5             |
| Acid value ...        | 20·1               | —                                              | —                     |

#### MIXED FATTY ACIDS.

|                                | Akee Oil. | Palm Oil.                          | Olive Oil. |
|--------------------------------|-----------|------------------------------------|------------|
| Specific gravity at 99° C. ... | 0·8365    | 0·8369<br>(Water at 15·5° C. = 1.) | 0·843      |
| Melting-point ...              | 42°-46°   | 47·7°-52°                          | 22°-26°    |
| Solidifying-point ..           | 40°-38°   | 44°-45°                            | 21°-24°    |
| Saponification value           | 207·7     | 206·5-207·3                        |            |
| Iodine value ...               | 58·4      | —                                  | 86·1-90·2  |

A. G. L.

**Test for Sesamé Oil in Vegetable and Animal Oils. Tambon.** (*J. Pharm. Chim.*, 1901, xiii., [6], 57; through *Chem. Zeit. Rep.*, 1901, 40.)—The reagent

consists of 3 or 4 grammes of pure dextrose dissolved in 100 grammes of hydrochloric acid. In a stoppered tube 7 or 8 c.c. of the reagent are shaken for two or three minutes with 15 c.c. of oil, the whole is heated till it begins to boil, shaken again, the tube closed and allowed to cool. The smallest trace of sesamé oil causes the liquid to appear pink, with a violet cast, which quickly changes to cherry-red. If 1 to 5 per cent. of sesamé are present, the colour develops in a few minutes; with 10 per cent. it shows immediately, and gradually becomes stronger. The reaction also succeeds with fatty acids.

F. H. L.

**Halphen's Reaction for Cotton Oil. Presence of Cotton Oil in American Lard.** P. Soltsien. (*Zeits. öffentl. Chem.*, 1901, vii., 25; through *Chem. Zeit. Rep.*, 1901, 52.)—In consequence of Raikow's statements and his own investigations, the present author has now reverted to the use of amyl alcohol in this test. He adds 20 per cent. of a 1 per cent. solution of sulphur in carbon bisulphide to the oil or fat, and then introduces about one-half the total volume of amyl alcohol. Light at first hastens the appearance of the colour and then bleaches it.

F. H. L.

**The Characteristics of Lipase.** J. H. Kastle and A. S. Løevenhart. (*Amer. Chem. Journ.*, 1900, xxiv., 491-525.)—Ethyl butyrate is so rapidly hydrolyzed by lipase that it can be used to measure the activity of the enzyme.

In their experiments the authors prepared the extract of lipase by macerating 10, 20 or 50 grammes of the fresh pancreas of a pig with coarse white sand, extracting it with water or glycerin, and diluting to 100 c.c. In each case 4 c.c. of water, 0.1 c.c. of toluene (as a preservative), and 0.26 c.c. of ethyl butyrate were heated for five minutes at 40° C., and then, after the introduction of 1 c.c. of the extract, for a further forty minutes, after which the liquid was titrated with  $\frac{N}{20}$  potassium hydroxide solution.

In comparison with the pancreas, the other tissues of a pig showed the following relative degrees of activity: pancreas, 1.0; liver, 2.93; kidney, 0.50; submaxillary gland, 0.36.

Comparative experiments with the extracts from the livers of other animals, in which the action of the enzyme was continued for fifteen minutes, gave the following amounts of hydrolysis: Pig, 8.66; sheep, 4.77; duck, 2.70; ox, 2.20; and chicken, 1.95 per cent.

On repeated filtration of the extracts, the lipase is almost completely removed from the liquid. It is more stable than is usually supposed, and the extract can be kept in a refrigerator for several days without losing its activity.

Ethereal salts are most rapidly hydrolysed by lipase at 40° C., whilst the enzyme is destroyed at 60°-70° C. Most of the common antiseptics are injurious, and, in particular, sodium fluoride, hydrofluoric acid, and acids in general.

The authors find that the velocity of the reaction is not proportional to the active mass of the ethereal salt, but is nearly so to the concentration of the enzyme. In the case of ordinary extracts the reaction is not complete, though it is practically so when very active extracts of the enzyme are used, or when the proportion of ethereal



salt is very small. The co-efficient of the velocity is not constant, but decreases with the progress of the reaction.

By means of lipase, the authors have effected a synthesis of ethyl butyrate from butyric acid and alcohol, and from this conclude that the action of the enzyme is reversible. They consider that this discovery may throw light upon the question of the storage and utilization of fatty reserve material by plants. C. A. M.

**Notes on the Examination of Beeswax.** G. Buchner. (*Chem. Zeit.*, 1901, xxv., 21 and 37.)—Valuation of wax becomes more difficult when the Hübl constants are normal or nearly so, and the qualitative tests hint at impurities. In such cases the author's process (*Chem. Zeit.*, 1895, xix., 1422) is best employed to ascertain the "Buchner number"; Werder's recent method (*loc. cit.*) for the determination of neutral matter can also be recommended.

Occasionally the constants are abnormal, but the qualitative tests suggest purity. In general the limits laid down by Hübl and Allen (19 to 21, 73 to 76, 92 to 97, 3·6 to 3·8) are correct; sometimes, however, one obtains 17·5 to 21, 70 to 78, 87·5 to 99. The soft agreeably-smelling Ghedda wax (from British India and Bombay) often gives 5·33, 88·35, 93·68, 17·6; while Ahrens and Hett have obtained similar figures from humble-bee and cicada waxes. Ten per cent. of Ghedda wax added to a normal product would yield acid and ester values 18·53 and 76·3; 20 per cent. would show 17·06 and 77·6; 50 per cent., 12·65 and 81·67; yet each would be pure wax. African wax also gives abnormal constants. The author has received a sample of comb from Afrat, near Mogador. When this was purified by repeated melting it gave: specific gravity at 15° C., 0·961; melting-point, 64° to 65°; solidifying-point, 61°; iodine value, 11·65; and the average Hübl constants 19·92, 79·43, 99·35, 3·98. The stearic acid test showed a slight amorphous deposit in twenty-four hours, as almost all African waxes do; but no foreign matter could be detected. Chemically bleached wax of undoubted purity sometimes exhibits a high acid value, as the following figures indicate: 23·19 to 26·23, 69·00 to 73·93, 95·00 to 98·45, 2·70 to 3·20.

It is clear that the Hübl constants are no longer sufficient by themselves to enable the purity of beeswax to be judged. Qualitative tests must also be employed. The presence of 1 per cent. of stearic acid may correspond with the addition of 15 per cent. of "composition"; and often only 5 or 10 per cent. are mixed with the wax, for even this small amount of factitious matter represents a considerable annual profit to the manufacturer. F. H. L.

## INORGANIC ANALYSIS.

**Determination of Small Quantities of Silver in Sulphide Ores.** A. Holiard. (*Rev. Phys. Chim.*, 1901, v., 55; through *Chem. Zeit. Rep.*, 1901, 61.)—One hundred grammes of the sample are dissolved in 10 c.c. of strong sulphuric acid and 300 c.c. of a mixture of 3 volumes of nitric acid of 36° B., and 1 volume of hydrochloric acid of 22° B. The whole is evaporated till sulphuric acid fumes have nearly disappeared, and taken up in a mixture of 75 c.c. of water, 5 c.c. of hydrochloric acid, and

20 c.c. of nitric acid of 36°. (If the ore contains much lead, the lead sulphate of the residue is extracted with sodium hydroxide of 12° Beaumé.) The insoluble matter is filtered off, washed, and dissolved in potassium cyanide. The solution is diluted to 250 c.c.—it should contain 2 per cent. of cyanide—and electrolyzed for a few hours with a current of 0.05 ampère. The silver is taken up in 50 c.c. of nitric acid and 50 c.c. of water, and determined by Volhard's method.

F. H. L.

**Volumetric Estimation of Mercuric Chloride in Aqueous Solution.** A. Archetti. (*Boll. Chim. Farm.*, 1900, xxxix., 765; through *Chem. Zeit. Rep.*, 1901, 11.)—This process depends on the formation of "white precipitate" when mercuric chloride is treated with ammonia. A few drops of alcoholic phenolphthalein are added to the mercury solution, and decinormal ammonia is run in till the pink colour is permanent. Each c.c. of reagent corresponds to 0.271 gramme of corrosive sublimate.

F. H. L.

**A New Method of Separating Metals of the Platinum Group.** Leidié. (*Journ. Pharm. Chim.*, 1901, xiii., 18-23.)—The industrial methods employed for the extraction of platinum and iridium from the ore leave residues which contain various rare metals. For the separation of these the author recommends the following method, based on the characteristics of their double alkali nitrites:

*I. Elimination of Foreign Metals and Conversion of the Platinum Metals into Double Alkali Nitrites.*—The residue is ignited in the air at a dull red heat, and reduced in hydrogen. It is next treated with water, then with hydrochloric acid, and again reduced in hydrogen. The metallic residue is mixed with twice its weight of sodium chloride, pulverized, and heated in a current of dry chlorine. The fixed and volatilized products are treated with a large excess of water acidulated with hydrochloric acid, in which process nearly the whole of the silver chloride is dissolved (by means of the sodium chloride present), whilst but little lead chloride is dissolved.

The solution is partially neutralized with sodium carbonate and brought nearly to the boiling-point. Sodium nitrite is now introduced little by little until the liquid becomes neutral to turmeric, at which point sodium carbonate is added until the precipitate no longer increases. The liquid is then boiled, left to cool, and filtered.

The sodium nitrite precipitates the iron as sesquioxide, and the gold in the metallic form. The sodium carbonate precipitates all such metals as lead, silver, zinc, tin, bismuth, copper, etc., originally present in the mineral or introduced in the treatment.

The metals of the platinum group remain in solution as double nitrites, having the following formulæ:

|                                 |     |     |                                                   |
|---------------------------------|-----|-----|---------------------------------------------------|
| Nitrite of ruthenium and sodium | ... | ... | $\text{Ru}_2(\text{NO}_2)_6 \cdot 4\text{NaNO}_2$ |
| " of platinum                   | "   | ... | $\text{Pt}(\text{NO}_2)_2 \cdot 2\text{NaNO}_2$   |
| " of palladium                  | "   | ... | $\text{Pd}(\text{NO}_2)_2 \cdot 2\text{NaNO}_2$   |
| " of iridium                    | ... | ... | $\text{Ir}_2(\text{NO}_2)_6 \cdot 6\text{NaNO}_2$ |
| " of rhodium                    | ... | ... | $\text{Rh}_2(\text{NO}_2)_6 \cdot 6\text{NaNO}_2$ |

The osmium is present in the form of the double chloride,  $\text{OsCl}_3 \cdot 3\text{NaCl}$ .



II. *Separation of the Platinum Metals—Osmium, Ruthenium.*—The nitrites mentioned above are not precipitated either by alkalis or alkali carbonates. Sodium hydroxide is added to their solution, and a current of chlorine passed through, whilst the volatile products are collected in water containing alcohol. The osmium and ruthenium salts are thus converted into the volatile peroxides  $\text{OsO}_4$  and  $\text{RuO}_4$ . At the end of the operation the distillation flask is slightly heated to expel them completely with the steam. The alcohol in the receiver reduces them to the metallic state, and they are then separated from each other by Deville and Debray's method (*Ann. de Chim. et Phys.* [5], lvi., 476, 480).

*Iridium, Rhodium.*—The residual liquid is acidified with hydrochloric acid and boiled, and the metals reconverted into nitrites by the addition of sodium nitrite until the reaction is neutral. It is then cooled and saturated with ammonium chloride. This yields a precipitate of the double nitrites of iridium and rhodium with ammonium, which are insoluble in solutions of ammonium chloride. The precipitate is collected after twenty-four hours, and repeatedly treated with hot *aqua regia* to convert the nitrites into the respective chlorides  $\text{IrCl}_4$  and  $\text{Rh}_2\text{Cl}_6$ . The *aqua regia* is expelled by evaporation, the residue taken up with cold chlorine-water, and the solution saturated with ammonium chloride.

The iridium is precipitated as the double chloride of ammonium and iridium. This is collected, dried, mixed with its own weight of sodium chloride, and heated in a current of chlorine at  $440^\circ$  to  $450^\circ$  C. By this means iridium is left as sodium iridium chloride, which is soluble in water, whilst any rhodium present is left as the anhydrous sesquichloride, which is insoluble in water.

The sodium iridium chloride is again converted into the ammonium salt, and the latter, when reduced by hydrogen, yields metallic iridium.

The filtrate from the iridium precipitate is evaporated to incipient crystallization. The crystals which then separate consist of a mixture of ammonium rhodium chloride ( $\text{Rh}_2\text{Cl}_6 \cdot 6\text{NH}_4\text{Cl}$ ) and ammonium chloride. The rhodium salt is converted into the double nitrite of sodium and rhodium, and this is precipitated as the ammonium salt. (If iridium were present, its corresponding salt, being a little more soluble, would be left in the mother liquid.) The ammonium rhodium nitrite is reconverted by hydrochloric acid into ammonium rhodium chloride, and metallic rhodium is obtained from this by reduction in hydrogen.

*Platinum, Palladium.*—The solution, after the removal of iridium and palladium, still contains double nitrites of platinum and palladium. It is evaporated to dryness after the addition of hydrochloric acid to convert the nitrites into chlorides. As the amount of sodium chloride present would interfere with the precipitation of the platinum, the residue is reduced in hydrogen. The metallic platinum and palladium, with possibly traces of iridium, are washed with water, dissolved in *aqua regia*, the solution evaporated, and the residue taken up with water. The liquid is placed in a flask, which it nearly fills, the air expelled by means of a current of carbon dioxide, and a current of nitrogen dioxide passed in as a reducing agent, and finally expelled by carbon dioxide.

The solution is now saturated with ammonium chloride and left for twenty-four hours, after which the ammonium platinum chloride is collected, recrystallized once or twice, and reduced in hydrogen to metallic platinum.

To the filtrate is added mercuric cyanide, which precipitates the palladium as palladious cyanide,  $\text{Pd}(\text{CN})_2$ . This is ignited, and the residue dissolved in nitric acid. The nitrate is converted into palladious chloride, and then into the nitrite of potassium and palladium, which is converted into the double chloride of potassium and palladium, and crystallized. This salt is reduced at a red heat in hydrogen, and the residue, when cooled in a current of carbon dioxide and washed with water to remove the potassium chloride, leaves metallic palladium.

In the course of this treatment any iridium is converted into the hydrated sesquichloride, and is not precipitated.

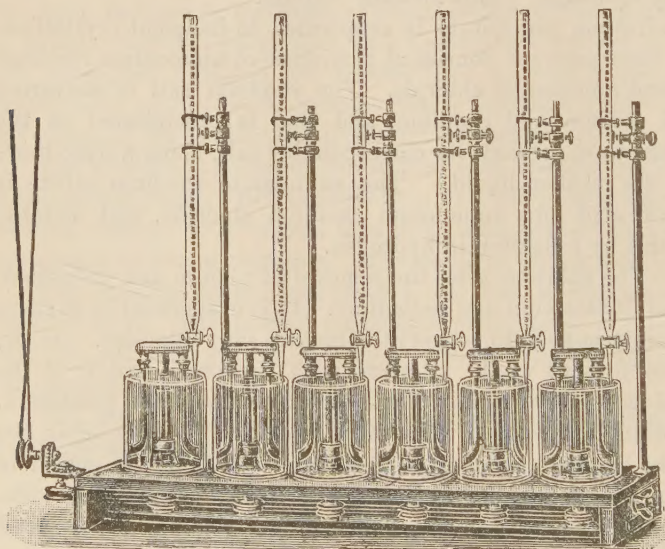
C. A. M.

**Titration of Free Alkali in Presence of Hypochlorites, Chlorates, and Chromates.** H. von Huber. (*Zeits. Electroch.*, 1901, vii., 396; through *Chem. Zeit. Rep.*, 1901, 32.)—The hypochlorite is reduced with normal sodium sulphite or sodium thiosulphate, the chromate precipitated with barium chloride, and the free alkali is titrated with normal hydrochloric acid, using methyl orange as indicator. If large quantities of alkali metal chromates are present, the barium chromate precipitate should be filtered off, and an aliquot portion of the liquid titrated.

F. H. L.

## APPARATUS.

**Apparatus for Parallel Titrations.** A. Thilmany. (*Chem. Zeit.*, 1901, xxv., 115.)—The titrating vessels in this apparatus are glass cylinders with a central tube



open at the bottom, and rising to the level of the outer part. Through these central tubes pass metal spindles with square heads, on which drop horizontal cross-pieces, and to the latter glass stirrers with metal caps are screwed. These agitators are bent outwards at their base so as almost to touch the walls of the glass vessels, while their upper parts revolve clear of the burette ends and taps. The central uprights are driven by gearing or

belting contained in the box of the stand from any convenient prime motor. As all the stirrers travel at the same speed, the amount of agitation in all the vessels is



uniform; and the whole arrangement becomes specially suitable for comparative experiments in dye-testing, etc. The apparatus is protected as a "Gebrauchsmuster."

F. H. L.

**A Simple Respirator.** A. Junghahn. (*Chem. Zeit.*, 1900, xxiv., 1138.)—As shown by the sketch, this apparatus is made of glass, with two automatic valves, the expired air escaping at the top, and that needed for inspiration being brought from behind the wearer through the rubber tube. A brass clip closes the nostrils. The device is equally suitable for laboratory or industrial purposes; it is stated not to impede the breathing, and, being all glass, is not itself corroded by acid vapours. The respirator is patented in Germany, and may be procured from Kaehler and Martini, Berlin, W.

F. H. L.



## REVIEWS.

**DIE GÄHRUNGSORGANISMEN IN DER THEORIE UND PRAXIS DER ALCOHOLGÄHRUNGSGEWERBE.** By ALBERT KLÖCKER. Stuttgart: Max Waag. Price 9 marks.

The above work, which is dedicated to Dr. Hansen, of Copenhagen, will be welcomed by chemists and all others concerned with the alcoholic fermentation industries. It is divided into three chapters, the first of which gives a short but succinct account of the principal theories of fermentation which have been propounded since the introduction of the microscope. The second chapter, which contains a description of the apparatus used and the methods employed in a fermentation physiological laboratory, is a very important one from a practical point of view. The author, having acted as assistant at Carlsberg for a number of years, is able to give collectively the methods employed there—the fountain-head, as it were, of this kind of work; though those employed elsewhere are not neglected. Chapter III. contains a description of the chief micro-organisms met with in the alcoholic fermentation industries. Intermingled with the above subjects, which are indicated in mere outline, much information of an interesting and valuable nature is to be found, such as the variations, temporary or permanent, that can be artificially brought about in the *Saccharomycetes*, etc. The directions all through the book are given with such clearness and minuteness of detail as to render the work eminently adapted for self-instruction. It is copiously illustrated, the engravings of the micro-organisms being particularly fine. Not the least valuable feature of the book is the large and full synopsis of the literature of the subject given in the appendix, a noteworthy innovation being the addition of short abstracts to many of the references, which give the essential points contained in the treatises or papers mentioned.

W. J. S.

A TEXT-BOOK OF URINE ANALYSIS, FOR STUDENTS AND PRACTITIONERS OF MEDICINE.  
By JOHN H. LONG, M.S., Sc.D. Price \$1.5 dollars.

The chief fault we should feel inclined to find with this book is that, while scarcely sufficiently comprehensive for the specialist, it is unnecessarily full for the practitioner. In most cases the various tests are clearly and concisely described, and the precautions necessary to avoid error are well explained. Unfortunately, however, one of the most important tests, from the point of view of the practitioner—viz., the coagulation of albumin by heat—is by no means well described. Filtration before boiling is not mentioned, nor the well-known expedients for contrasting the boiled with the unboiled part of the urine, and the best way of viewing the urine is also left to the, perhaps inexperienced, experimenter. Attention to these points greatly increases the delicacy of the test. The various tests for sugar are, on the whole, well described. We are, however, of opinion that Trommer's test might well have been omitted; for, unless applied with the greatest care, it is more apt to conceal than to reveal the presence of sugar. If it is to be used at all, the urine should, after the addition of the sulphate of copper, be filtered before boiling. The directions for the estimation of urea by hypobromite also leave something to be desired. All the apparatus described, with the exception of Huefner's original one, are only makeshifts, and in using them much time has to be wasted to allow the apparatus to fall to the temperature of the room. Also, why waste nearly a whole page in describing the Doremus apparatus, in which the author himself does not seem to believe?

The book is well printed, on good paper, and is commendably free from printer's errors.

A. D.

#### SOCIETY OF PUBLIC ANALYSTS.

#### LETTER TO THE CORPORATION OF THE CITY OF LONDON.

[COPY.]

*To the Corporation of the City of London.*

#### THE CITY ANALYSTSHIP.

The Council of the Society of Public Analysts view with regret the terms offered by the Corporation of the City of London in respect of the appointment of City Analyst.

These terms, in the opinion of the Council, are very inadequate, especially in regard to analyses of water, and, in view of the increasing responsibilities thrown upon Public Analysts, are not such as to allow of the work being conscientiously and at the same time remuneratively performed.

The Council regret that a body so important as the Corporation of the City of London, instead of giving a man of the highest standing a remuneration worthy of his position and attainments, should have encouraged a system of competition among professional chemists to secure a prominent position without regard to the adequate remuneration of their services.

Your obedient servants,

EDWARD BEVAN  
ALFRED C. CHAPMAN } Hon. Secs.

LONDON, April 10, 1901.